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(54) Title: METHOD OF THE PROPHYLACTIC TREATMENT OF MASTITIS

(57) Abstract

A method of prophylactic treatment of mastitis in mammalian, including human, mothers, is described. The method comprises administration of a prophylactically effective dosage of a human or veterinary medicament containing at least one type of xanthophylls, such as astaxanthin, to said mothers. Preferably, the astaxanthin exists in a form esterified with fatty acids, e.g. in the form of algae meal produced by culturing of the alga Haematococcus sp. Further, use of at least one type of xanthophylls, such as astaxanthin, for the preparation of a human or veterinary medicament for the prophylactic treatment of mastitis in mammalian, including human, mothers is disclosed.

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METHOD OF THE PROPHYLACTIC TREATMENT OF MASTITIS

The present invention relates to a method of the prophylactic treatment of mastitis of mammalian, including human, mothers. The method comprises administration of a prophylactically effective dosage of a human or veterinary medicament containing at least one type of xanthophylls, such as astaxanthin, to the mothers. The invention also relates to the use of at least one type of xanthophylls, such as astaxanthin, for the preparation of a human or veterinary medicament for the prophylactic treatment of mastitis.

Background

Mastitis (inflammation of the mammary gland) is a commonly appearing and often painful disease in both human and animal mothers during the breast feeding/suckling period as well as during the lactation period. The primary cause is usually a bacterial infection. Physical damage to the breasts, udder or the teats may predispose the individual to such infections. Further, mastitis can dramatically reduce milk production, which results in reduced nutrient and immunoglobulin intake by the offspring and/or reduced income for the dairy farmer. Therapeutic treatment usually involves medication, and consultation of a doctor/veterinarian, which is expensive.

Ingestion of mother's milk is of crucial importance for the growth and health status of the new born mammal. The milk is the primary source of energy, proteins, fat and other essential nutrients during the breast feeding/suckling period. In addition, in dairy farming, the level of milk production and yields are of great importance for the profitability of the farmer. In summary, any reduction in milk production will have serious economic and health consequences.

Our published International patent application WO 97/35491 relates to an agent for increasing the production of/in breeding and production mammals, and discloses experiments wherein sows were given feed supplemented with astaxanthin during a period prior to parturition and during lactation resulting in e.g. more piglets born alive.

Astaxanthin, and other xanthophylls, are known to exhibit antioxidative properties, and hence possess the ability to scavenge so-called free radicals. However, in biological tests astaxanthin has been shown to possess clearly the best antioxidative properties compared to other carotenoids (Miki W., 1991, Pure and Appl Chem 63 (1) : 141-146).

Description of the invention

The present invention is directed to a method of prophylactic treatment of mastitis in mammalian, including human, mothers, comprising administration of a prophylactically effective dosage of a human or veterinary medicament containing at least one type of xanthophylls to said mothers.

In a preferred embodiment the type of xanthophylls is astaxanthin. In a particularly preferred embodiment the astaxanthin exists in a form in which it is esterified with fatty acids. The last mentioned form of astaxanthin may be in the form of algal meal produced by culturing of the alga Haematococcus sp.

A prophylactically effective dosage of the preparation contains e.g. 0.01 to 1 mg astaxanthin per kg body weight per day.

The invention is also directed to the use of at least one type of xanthophylls for the preparation of a human or veterinary medicament for the prophylactic treatment of mastitis in mammalian, including human, mothers.

Here again, in a preferred embodiment the type of xanthophylls is astaxanthin. In a particularly preferred embodiment the astaxanthin exists in a form in which it is esterified with fatty acids. The last mentioned form of astaxanthin may be in the form of algal meal produced by culturing of the alga Haematococcus sp.

For example, the amount astaxanthin in the medicament is 0.01 to 1 mg per body weight of the human or animal mother.

In the present invention the human and veterinary medicaments may comprise a mixture of different types of xanthophylls or different forms of the same xanthophyll, such as a mixture of synthetic astaxanthin and naturally produced astaxanthin.

The human and veterinary medicament of the invention may comprise additional ingredients which are pharmacologically acceptable inactive or active, such as flavoring agents, excipients, diluents, carriers, etc., and it may be presented in a separate unit dose or in admixture with food or feed. Examples of separate unit doses are tablets, gelatin capsules and predetermined amounts of solutions, e. g. oil solutions, or emulsions, e.g. water-in- oil or oil-in-water emulsions. Examples of food in which the preparation of the invention may be incorporated is dairy products, such as yogurt, chocolate and cereals.

Description of experiments

The medicament used in the experiments contained the xanthophyll astaxanthin which was produced via the alga Haematococcus sp. by AstaCarotene AB, Gustavsberg, Sweden.

Naturally produced astaxanthin can be obtained also from fungi and crustaceans, in addition to from alga. Astaxanthin from other sources, and other xanthophylls as well, are expected to be similarly useful for the purposes of the invention. An advantage of using astaxanthin from alga is, however, that the

astaxanthin exists in a form esterified with fatty acids [Renström B. et al, 1981, Phytochem 20(11) :2561-2564], which esterified astaxanthin thereby is more stable during handling and storage than free astaxanthin.

Experimental design and results

A group of 120 dairy cows with a known record of milk production and incidence of mastitis from the previous lactation period were given algal meal (from *Haematococcus pluvialis*) to provide 100 mg natural astaxanthin per day during a period extending from parturition to 12 weeks thereafter.

During this period only one incidence of mastitis was recorded. This number should be compared to 8 cases recorded in the same cows during the previous lactation period.

Milk production was 6% higher in the current period (100 mg natural astaxanthin/day/cow) compared to the previous one (no natural astaxanthin).

CLAIMS

1. Method of prophylactic treatment of mastitis in mammalian, including human, mothers, comprising administration of a prophylactically effective dosage of a human or veterinary medicament containing at least one type of xanthophylls to said mothers.

2. Method according to claim 1, wherein the type of xanthophyll is astaxanthin.

3. Method according to claim 2, wherein the astaxanthin exists in a form esterified with fatty acids.

4. Method according to claim 3, wherein the esterified astaxanthin is in the form of algal meal produced by culturing of the alga Haematococcus sp.

5. Method according to claim 3 or 4, wherein the effective dosage of the medicament contains 0.01 to 1 mg astaxanthin per kg body weight per day.

6. Use of at least one type of xanthophylls for the preparation of a human or veterinary medicament for the prophylactic treatment of mastitis in mammalian, including human, mothers.

7. Use according to claim 6, wherein the type of xanthophyll is astaxanthin.

8. Use according to claim 7, wherein the astaxanthin exists in a form esterified with fatty acids.

9. Use according to claim 8, wherein the esterified astaxanthin is in the form of algal meal produced by culturing of the alga Haematococcus sp.

10. Use according to claim 8 or 9, wherein the amount astaxanthin in the preparation is 0.01 to 1 mg per kg body weight.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 98/02279

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A61K 31/12, A61K 31/07
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CA, WPI, MEDLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9735491 A1 (ASTACAROTENE AB), 2 October 1997 (02.10.97), page 1, line 1 - line 24, the claims --	1-10
A	EP 0770385 A1 (SUNTORY LIMITED ET AL), 2 May 1997 (02.05.97), page 3, line 29 - line 33; page 5, line 44 - line 49, the claims --	1-10
A	Patent Abstracts of Japan, Vol 14,No 215, C-716 abstract of JP 2-49091 A (Suntory LTD), 19 February 1990 (19.02.90) --	1-10
A	WO 9623489 A2 (BASF AKTIENGESELLSCHAFT), 8 August 1996 (08.08.96) --	1-10

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
11 March 1999	21 -03- 1999
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SE 9300901-7 A (ALGATECH AB), 20 Sept 1994 (20.09.94) -- --------	1-10

INTERNATIONAL SEARCH REPORT

International application No.
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Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.: 1-5
because they relate to subject matter not required to be searched by this Authority, namely:

Claims 1-5 relate to methods of treatment of the human or animal body by surgery or by surgery or by therapy. See PCT, Rule 39.1(iv). Nevertheless, a search has been executed for these claims. The search has been based on the alleged effects of the ompounds/compositions.

2. [ ] Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/02/99

International application No.
PCT/SE 98/02279

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9735491 A1	02/10/97	AU 2313397 A	17/10/97
		AU 7102996 A	17/04/97
		EP 0852517 A	15/07/98
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		SE 9601197 A	28/09/97
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SE 9300901-7 A	20/09/94	NONE	